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## SEA SPURGE (*EUPHORBIA PARALIAS*), A STRANDLINE PIONEER NEW TO THE PERTH REGION

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### INTRODUCTION

The foredune flora of southwestern Australia harbours a considerable number of alien species (Smith 1985). A few of these, such as Marram Grass (*Ammophila arenaria*), Pyp Grass (*Ehrharta villosa*) and, more recently, Sea Wheat (*Elymus distichus*) have been introduced for dune reclamation, but many more have arrived accidentally, often as 'stowaways' on trading vessels. Examples of such chance arrivals are European Sea Rocket (*Cakile maritima*) and Dune Arctotheca (*Arctotheca populifolia*). Both species are strandline pioneers, i.e. colonize flotsam and sea wrack deposits on the upper beach, and have become conspicuous components of the local vegetation (Heyligers 1984, 1987).

In October 1987 I found a single plant of another introduced strandline pioneer, Sea Spurge, established at Coogee Beach, not far from Woodmans Point (Figs. 1 and 2). Its presence there, however, was short-lived; when I visited this beach again in September 1988, severe erosion of the upper beach and foredune was evident and the Sea Spurge plant, along with the neighbouring vegetation, had disappeared. No seedlings were found, and an inspection of beaches in the vicinity of Woodmans Point located no other Sea Spurge plants. Nevertheless, I expect that sooner or later this species will turn up again in the Perth region.



Figure 1. Sea Spurge growing on a sanded-over flotsam deposit on Coogee Beach, together with scattered Dune Onion Weed (*Trachyandra divaricata*) and some young tussocks of *Spinifex longifolius*. The foreground shows the recent strandline with European Sea Rocket (*Cakile maritima*). The most prominent plants on the foredune are flowering *S. longifolius* and Marram Grass. This picture was taken on 22 October, 1987.

This paper provides information about the distribution and migration history of Sea Spurge to set the ephemeral occurrence at Coogee Beach in a broader context.



Figure 2. The recent establishment of this Sea Spurge plant is shown by the fact that only three stems have as yet reached flowering stage. (Stems die back after fruiting, but are generally retained in the tussock for another season, thus providing a means for age-determination.)

## GENERAL DISTRIBUTION AND MIGRATION HISTORY

Sea Spurge is indigenous to the sandy shores of the Mediterranean Sea, and those of the Atlantic Ocean from Ireland and England to Spanish Morocco and the Canary Islands. While Sea Spurge is able to cope with a wide range of climatic conditions, its distribution is restricted to strandlines, incipient foredunes and unstable coastal dunes. The round seeds, 3 mm in diameter, can float for many years without losing their viability (Heyligers 1985). In Australia, Sea Spurge can be found on many sandy beaches and drifting dunes along the southern coastline, from Geographe Bay in W.A. to Wilsons Promontory in Victoria. It also occurs on some beaches in Tasmania, and has recently been reported from Narooma on the South Coast of New South Wales (P. Clark, pers. comm.).

For the reconstruction of migration histories of introduced coastal plants invaluable information is provided by the labels of plant specimens held in State and University Herbaria (Heyligers 1983, Rodman 1986). Hence we know that the first Australian collections of Sea Spurge were made near Albany in March 1927 by W. M. Carney and C. A. Gardner, i.e. in the year the latter was appointed as Government Botanist (Fig. 3). A collection made by Dr W. E. Blackall more than a decade later, shows that the species persisted at King George Sound. In the meantime, the South Australian botanist, Prof. J. B. Cleland, had discovered Sea Spurge at Point Pearce, near Port Victoria on the eastern shore of Spencer Gulf. There are two collec-

tions of his from that location, one made on 24 February 1934, the other on 5 August 1937. The seed from which the population at Point Pearce developed, could have drifted across from King George Sound. Such a journey could take from three months to more than a year, if results of drifter-buoy tracking (Anon. 1987) and drift card releases (Marshall and Radok 1972) in the Southern Ocean can be used as a yardstick. A more plausible explanation, given the limited local distribution of Sea Spurge at that time, is that seeds were brought in by a trading vessel calling at Port Victoria, either from Albany or from a Northern Hemisphere port.

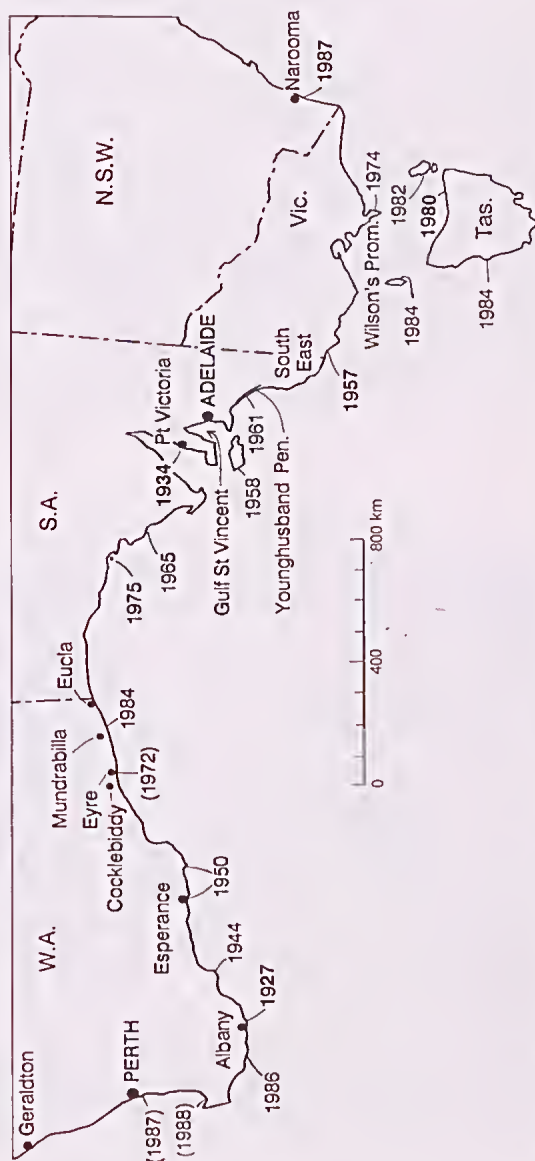


Figure 3. The dispersal history of Sea Spurge in southern Australia as revealed by herbarium collections and other observations (dates in parentheses). The first collection for each State is shown in heavier lettering.

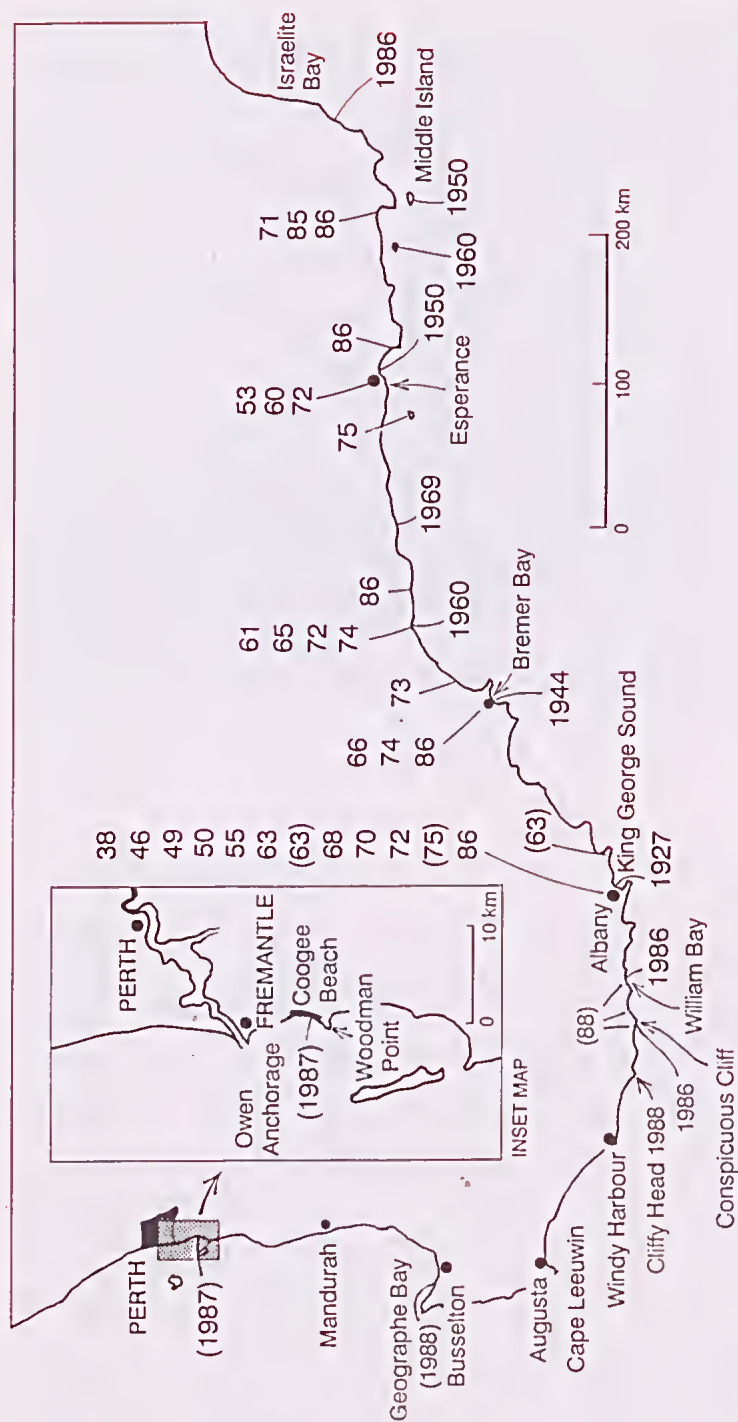


Figure 4. Overview of Sea Spurge establishment history in southwestern Western Australia, as shown by herbarium collections and some other observations (in parentheses). Dates outside the coastline indicate the general trend of dispersal from King George Sound (compare Fig. 3), those inside show the persistence of Sea Spurge after colonization.



## MIGRATION PATTERNS IN WESTERN AUSTRALIA

Both King George Sound and Port Victoria have been source areas for subsequent regional dispersal. Herbarium specimens indicate that, until recently, Sea Spurge spread in Western Australia only in an easterly direction (Fig. 4). G. Baty found it at Bremer Bay in 1944, while in 1950 it was collected near Esperance by Prof. Cleland and on Middle Island in the Recherche Archipelago by the Assistant Government Botanist of Victoria, Dr J. H. Willis. From the 1950s onward, collections from intervening sections of the coast have become increasingly frequent and a survey by W. R. Archer in December 1986 confirmed Sea Spurge to be a common seashore plant between King George Sound and Israelite Bay.

Herbarium records will never reveal the complete story; this is, for instance, shown by the fact that there is only one Sea Spurge collection from the coast between Israelite Bay and Eucla, viz. the one made by B. Downing south-east of Mundrabilla on 3 April, 1984. Yet, on the beach south of Cocklebidy, Sea Spurge and Dune *Arctotheca* were photographed by Prof. N. C. W. Beadle on 29 October 1972 (Beadle pers. comm. re fig. 23.5 in Beadle 1981), while in 1977 Sea Spurge was reported by W. T. Graham to be common on foredunes and drifting dunes near the old Eyre Telegraph Station (now Bird Observatory) where, since January 1979, it has actually been used for dune stabilization (Davies 1985). I doubt, however, the correctness of Davies' assertion (*ibid.* p. 19) that Sea Spurge was "probably introduced at the time the telegraph station was built", i.e. in the 1870's. This just does not tally with the fact that half a century passed before any herbarium collections of this species were made.

## RECENT FIELD OBSERVATIONS

The absence of herbarium specimens, reinforced by the fact that Sea Spurge is not listed by Smith (1985), suggested that this species had not spread westward from King George Sound. In December 1986, however, Mr Archer found Sea Spurge on the frontal dunes at William Bay, while the most westerly occurrence discovered during his survey was a small colony near Conspicuous Cliff. There, a concentration of young plants was found on and near flotsam along a barred creek outlet.

In September 1988, I continued the search for Sea Spurge along the south coast and found it to be common on the drifting dunes near Peaceful Bay to the east of the headlands of which Conspicuous Cliff forms a part, while at Conspicuous Cliff it had spread to other creek banks and the marram-built foredunes. I also found an isolated colony in a large, stabilized blowout at Mandalay Beach, near Clifty Head. No other occurrences further west were discovered, notwithstanding the fact that beaches like those near Windy Harbour and Augusta appeared to offer favourable conditions for colonization.

Having located the western limits of Sea Spurge distribution along the south coast, I was most surprised to find this species well established along the shores of Geographe Bay in the vicinity of Busselton. Its abundance suggested a relatively long presence in the area, possibly a decade or more.

I am still inclined, as I was after assessing the herbarium records, to interpret the late appearance and the still limited occurrences of Sea Spurge west of

King George Sound an indication of the existence of natural obstacles to an effective spread in westerly and, beyond Cape Leeuwin, in northerly directions, and to associate the occurrences near Busselton and Coogee with shipping and pleasure boating activities on Geographe Bay and Owen Anchorage, rather than to assume an unaided mode of transport.

## EPILOGUE

If there are any beachcombers among the readers who could fill in gaps in the distribution of Sea Spurge as reported in this paper or are able to keep a lookout for new establishments I would be most grateful to hear from them. In this way we may succeed in reconstructing the dispersal history of this species and gaining a better insight into the operative factors.

## ACKNOWLEDGEMENTS

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